7

7.0 Appendices

7.1 Charter

Federal Emergency Management Agency

Charter of the Technical Mapping Advisory Council

Establishment

The Director of the Federal Emergency Management Agency (FEMA) hereby establishes the Technical Mapping Advisory Council (hereinafter referred to the "the Council"), as directed under the National Flood Insurance Reform Act of 1994, P.L. 103-325, Title V, Section 576. The Council is established in accordance with the Federal Advisory Committee Act, 5 U.S.C. App. 2.

Objectives and Duties

1. The Council's objective is to evaluate the production, distribution, and use of Flood Insurance Rate Maps (FIRMs) and other mapping products prepared by FEMA in support of the National Flood Insurance Program (NFIP) and to make recommendations to the Director for the improvement of these products.
2. The Council shall make recommendations to the Director in the following areas:
   a. cost-effective improvement in the accuracy, quality, utility, and distribution of FIRMs and other mapping products; and
   b. standards and guidelines for use in preparing and revising FIRMs and other mapping products.
3. The Council must submit an annual report to the Director containing the following:
   a. a description of the Council's activities;
   b. an evaluation of the status and performance of FEMA's mapping products and activities to revise and update these products; and
   c. a summary of the Council's recommendations.

4. The Council may hold hearings; receive evidence and assistance from federal, state, or local government agencies or private firms and individuals; and conduct research as necessary to meet its objectives. The Council may draw on the expertise of its members as well as other sources when making recommendations to the Director.

5. To ensure that the Council's recommendations are consistent to the extent practicable with national digital spatial data collection and management standards, the Council's Chairperson shall consult with the Chairperson of the Federal Geographic Data Committee established under Office of Management and Budget Circular A-16.

6. The Council functions solely as an advisory body and will comply fully with the provisions of the Federal Advisory Committee Act.

Membership and Chairperson

1. The Council shall consist of a designee of the Director and 10 additional members appointed by the Director or his designee. Under P.L. 103-325, the membership must include:

   a. the Undersecretary of Commerce for Oceans and Atmosphere (or his or her designee);

   b. a member of recognized surveying and mapping professional associations and organizations;

   c. a member of recognized professional engineering associations and organizations;

   d. a member of recognized professional associations or organizations representing flood hazard determination firms;

   e. a representative of the U.S. Geological Survey;

   f. a representative of state geological survey programs;

   g. a representative of state NFIP coordination offices;

   h. a representative of a regulated lending institution;

   i. a representative of the Federal Home Loan Mortgage Corporation (now known as Freddie Mac); and

   j. a representative of the Federal National Mortgage Association (now known as Fannie Mae).

2. The Director's designee requested nominations for membership from the agencies or organizations listed above. From the submitted nominations, members were selected based on their demonstrated knowledge and competence regarding surveying, cartography, remote sensing, GIS, and the technical aspects

of preparing and using FEMA's mapping products. Members were notified of their appointment by letter on November 24, 1995.

3. The members of the Council shall elect one member of the Council to serve as Chairperson.

4. The Chairperson may appoint officers to assist in carrying out the duties of the Council.

Administrative Procedures

1. The Council shall meet no less than twice each year at the request of the Chairperson or a majority of its members.

2. The Council may take action by a vote of the majority of the members.

3. At the request of the Chairperson, the Director may detail, on a nonreimbursible basis, FEMA personnel to assist the Council in carrying out its duties.

4. Council members shall not receive additional compensation for their service on the Council.

5. The annual cost to FEMA of operating the Council is $100,000.

Duration of the Council

P.L. 103-325 stipulates that the Council terminate its activities after 5 years. The Council will terminate its activities five years after the date when all members of the Council were appointed under section 576.2(k)(b)(1) indicated above as November 24, 1995.

April 9, 1996 /S/ James L. Witt

7.2 Summary of the Interests of Constituent Organizations

7.2.1 The American Congress on Surveying and Mapping

Internet: www.survmap.org

The Organization. The American Congress on Surveying and Mapping (ACSM) is the recognized professional society for surveying and mapping associations and organizations. Named the "National Congress on Surveying and Mapping" when it was founded in June 1941, its name was changed to encompass members from throughout the world (although the majority of ACSM's 7,000 members are located in the United States). ACSM is a non-profit, educational organization comprising four member organizations: Cartography and Geographic Information Systems, the American Association for Geodetic Surveying, Geographic and Land Information Systems, and the National Society of Professional Surveyors. ACSM's objectives are to advance the sciences of surveying and mapping and related fields; to further the welfare of those who use and make maps; to encourage the development of educational programs in surveying, mapping

and charting; and to support publications that represent the professional and technical interests of surveying and mapping.

Mapping Concerns. The common mapping interest of the ACSM's four member organizations is for mapping data that are accurate and reliable. This primary interest of licensed professionals is generated by concern for the best interests of citizens who must rely on the data provided by FEMA, such as FIRMs and Q-3 digital products. Specific areas of concern are:

- **Data quality and documentation**. ACSM has identified needs for:
  - written criteria for quality of map location data;
  - standard specifications for base-mapping scale and accuracy beyond "best available," including minimum criteria for acceptance or rejection; and
  - specifications on how to evaluate data (for consistent analysis).
- **Application of data beyond limits of technical merit/capabilities**. ACSM is aware of inappropriate uses of data, such as digital TIGER files, and the enlargement of USGS quadrangle maps beyond mapping standards.
- **Inconsistent application of technical data**. Although FEMA has stated that the error in calculating the base flood elevation (BFE) is within plus-or-minus one-half foot, LOMAs are issued based on elevation differences down to one-tenth of a foot.
- **The technical merit of procedures**. Reanalysis of old data using new methodologies without the addition of new data is permitted for restudies, and reanalyzed old data may be place on existing base maps without corrections. The reason given for these situations is cost savings. Reanalysis without corrective information makes the process purely academic, and ACSM believes it is an inappropriate use of FEMA funds and can also contribute to mapping inconsistencies.
- **Public reliance on a public agency**. Products described as being the basis of information for in-house use only are being released to the public for cost recapture and other reasons. The proliferation of GIS has underscored the need for extreme care in making data and metadata available. The name of a federal government agency emblazoned on data leads the uneducated public to perceive that the data are of a standard of quality generally produced by the government, although internal FEMA users know of limitations not known to the customer.
- **Enforcement of community involvement in updating procedures**. ACSM believes that failure to strictly enforce federal floodplain management statutes in communities participating in the NFIP results in harm to the public, which pays unnecessary insurance premiums in some areas, and does not purchase insurance in some areas in which it should be required.

7.2.2 American Society of Civil Engineers

Internet: www.asce.org

The Organization. The American Society of Civil Engineers (ASCE), representing professional engineering associations and organizations, is one of the oldest professional organizations in the United States, founded in 1853. ASCE has 119,000 members and has established committees to actively address many of the issues pertinent to the Council's mandate. Some of the issues are natural disaster reduction, land use, hydraulics and hydrology, urban water resources, water resources planning, coastal engineering and coastal zone management, GIS, urban drainage standards, and flood-resistant design and construction.

Mapping Concerns. ASCE is concerned about the effect flooding has on the nation's public health and welfare. ASCE is interested in seeking ways to guide new development away from flood-hazard areas and assure that structures constructed in flood-hazard areas are properly flood-proofed. ASCE also is concerned that flood-protection structures, such as levees and dams, are properly designed and built to provide the anticipated protection; and that bridges do not aggravate flooding.

Sound, technical hydrologic and hydraulic analyses and correct mapping of the floodplains are the bases for guiding new development away from flood-hazard areas, and for assuring that flood-prone structures are properly flood-proofed. These are the same bases used by FEMA to delineate floodplain limits on FIRMs, and used by scores of engineers in designing levees, dams, bridges and urban drainage systems.

7.2.3 Association of American State Geologists

Internet: www.kgs.ukans.edu/AASG/index.html

The Organization. The Association of American State Geologists (AASG) consists of the chief executive officers in the state geologic surveys in all 50 states and Puerto Rico. The group participates in federal and state legislative activities through a Federal Liaison Committee. Geologic hazards and related risk issues are handled through standing committees on geologic hazards and coastal processes.

Mapping Concerns. Members of AASG are interested and involved in technical analysis, mapping, and public education related to flood hazards, coastal erosion and riverine erosion, and tsunamis. Concerns include the possible misuse of geologic maps in preparing flood maps, the opportunity to incorporate flood and erosion hazards in analysis and mapping products for multiple hazards, and the updating of flood maps in coastal areas vulnerable to tsunamis.

7.2.4 Association of State Floodplain Managers

Internet: www.floods.org

The Organization. ASFPM is an organization of professionals involved in floodplain management; flood-hazard mitigation; implementation of the NFIP; and flood preparedness, warning, and recovery. The group represents the flood-hazard specialists of local and state governments and the federal government; the research community; the insurance industry; and the fields, among others, of engineering, hydrologic forecasting; emergency response, and water resources.

ASFPM supports comprehensive, nonstructural and structural management of the nation's floodplains and related water resources. The organization seeks to help the public and private sectors, through coordinated and well-informed efforts, to reduce losses of human lives and property damage resulting from flooding. It also seeks to preserve the natural and cultural values of floodplains, and avoid actions that exacerbate flooding. To reach these goals, ASFPM fosters communication among all elements of the community responsible for flood-hazard activities, provides technical advice to government agencies and other entities about proposed actions or policies that will affect flood hazards, and encourages flood-hazard research, education, and training.

Mapping concerns. ASFPM's top priorities for flood-hazard maps that serve their users follow:

- **Maps should enable accurate determinations**. Users of maps should be able to determine whether a specific site is in or out of the floodplain; and the relationship between floodplain information and base-map information, such as streets and corporate limits, should be valid.
- **Maps should be technically defensible**. The technical bases of the floodplain outline (hydrology, topographic information, hydraulics, plan-view delineation of the floodplain) should be stated clearly, and other appropriate professionals, using the same procedures, should get similar results. The maps should reasonably and accurately represent the one-percent-chance floodplain using accepted methodologies.
- **Maps should be current and comprehensive**. As mapped conditions of various types change, maps should be updated. Unstudied stream reaches should be studied before rather than after development.
- **Map revision should be simple and fair**. Errors, omissions, and inconsistencies on the FEMA maps should be corrected by FEMA quickly and easily. Changes made by others, whether they result from physical alterations of the floodplain or from new engineering analyses, should be processed quickly and easily once all pertinent technical information has been provided to FEMA.
- **Study/restudy needs should be based on the level of vulnerability to flood hazards.** The first studies/revisions should be made on stream reaches facing the greatest potential for property damage and loss of life because of encroachment in the floodplain.

ASFPM believes that maps can be improved by addressing the following issues:

- **Accuracy.** Some significant flood hazards have been mapped inaccurately or not at all. Streets and corporate limits are particular problems. Instances of floodplain inaccuracy also have been seen. A strong correlation between information on the maps and conditions in the field has not always been ensured.
- **Technical support**. Technical supporting information is not always available.
- **Coordination with local and state officials**. Coordination with local and state officials in the preparation and revision of flood-hazard maps is not perceived to be thorough in all instances, and is perceived to lead to inaccuracies and omissions when it has not been thorough. For example, appropriate local officials have not been notified of some coordination meetings in some instances. In other instances, technical data (e.g., hydraulic analyses, topographic information or GIS base mapping) from local sources have not been used in the preparation of new FIRMs.
- **Level of map detail**. FEMA's finished maps lack sufficient topographic and cultural information to meet the needs of many users. The work maps, which are used to produce finished maps, generally are superior in terms of scale and level of detail; yet, they are neither granted any official status nor published by FEMA.
- **Mechanisms for including map information compiled by non-FEMA public agencies**. A consistent process through which FEMA can incorporate into its mapping activities the floodplain information compiled or prepared by other public entities is needed.
- **Use of new technology**. New cartographic, topographic and water resources technology such as GIS, laser-based topographic mapping, Global Positioning Systems surveying, 2-dimensional hydraulic models, and real-time hydrologic and hydraulic modeling could improve the preparation, presentation and delivery of floodplain information to all users. New means of conveying the information such as printing-on-demand, electronic presentation instead of or in addition to paper presentation, and the possible use of 3-dimensional computer imagery should be explored.

7.2.5 Bank of America

Internet: www.bankofamerica.com

The Organization. Bank of America is one of the largest financial services companies in the United States providing a diversified range of banking and certain non-banking financial services and products through its various subsidiaries.

Products and services are delivered through 4,700 banking centers and 14,000 ATMs, that serve 30 million households and 2 million small businesses in 21 states (Arizona, Arkansas, California, Florida, Georgia, Idaho, Illinois, Iowa, Kansas, Maryland, Missouri, Nevada, New Mexico, North Carolina, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Virginia, and Washington) plus

the District of Columbia and Hong Kong. Services are also provided through telephone and personal computers and through commercial banking offices that serve middle market businesses with sales of up to $500 million.

Further, domestic and international corporations, financial institutions, and government entities are supported through offices in 37 countries in four distinct geographic regions: the U.S. and Canada; Asia; Europe, Middle East and Africa; and Latin America. The Banks deliver specialized industry expertise to the following sectors: aerospace and defense, apparel, automotive and transportation, business services, communications, construction and engineering, consumer products and services, entertainment and media, financial services, food and agribusiness, healthcare and pharmaceuticals, natural resources (chemicals, energy, paper and forest products, utilities), real estate, retail, sports, and technology.

Its mortgage division is one of the top five mortgage servicing companies, and is among the nation's top ten retail mortgage lenders. Bank of America employs approximately 158,900 individuals full time.

As a regulated lender, Bank of America is responsible for determining a collateral property's flood-zone status. If the property is determined to be located in an SFHA, the regulated lender must require flood insurance for the loan term. Until the mid-1980s, lenders were left to their own devices in determining a property's flood-zone status. The maps, in themselves, proved to be less-than-adequate tools for that purpose. Little detail existed to assist a lender in locating a property on the map. Detail that may have been provided often was inaccurate and misleading (e.g., had misnamed or misplaced streets). Many lenders simply left the determination up to the appraiser. After all, the lender's business is not cartography.

As a result of the lenders' need for better interpretation of maps, a new industry emerged: the flood-zone determination company. The lending industry is increasingly concentrating on its primary purpose of making loans and contracting with determination companies to interpret maps. The zone determination industry has prospered, particularly following the enactment of National Flood Insurance Reform Act of 1994 (NFIRA) and the "perpetual vigilance" rule affecting Government-Sponsored Enterprise loans. That rule requires a lender servicing such a loan to know immediately any change in the subject property's flood zone, and to act accordingly.

Mapping Concerns. Millions of dollars are spent annually to locate properties on flood maps. Even though a lender may contract out the determination requirement, it still bears the responsibility for the accuracy of the determination. Consequently, the lender has a high level of interest in a flood map's readability. Disputes often develop over the location of a property, and proper determinations affect a lender's compliance rating with its regulating agency. Further, a lender needs to be aware of the risk to loss of properties accepted as collateral on loans. Although the lending industry always reserves the right to require insurance in the kinds and amounts thought necessary to protect the loan, the industry has followed the government's lead in requiring insurance only on properties determined to be in an SFHA.

Bank of America, as a representative of the lending industry, believes that the Council's work will result in changes to the maps and the mapping process so that a property's flood-zone status

can be determined more easily, and that the maps will reflect more accurately and consistently a property's real potential to loss due to flood. Finally, the lending industry wants to see a more efficient and accessible means of obtaining flood-zone status information.

7.2.6 Fannie Mae

Internet: www.fanniemae.com

The Organization. Fannie Mae is a congressionally chartered, shareholder-owned company and the nation's largest source of home mortgage funds. At Fannie Mae we are in the American Dream business. Our mission is to tear down barriers, lower costs, and increase the opportunities for homeownership and affordable rental housing for all Americans. Because having a safe place to call home strengthens families, communities, and our nation as a whole. As a leader in the secondary market, Fannie Mae purchases residential home loans from local mortgage lending institutions—the primary market—thus replenishing its supply of mortgage funds available for lending. Fannie Mae purchases for its own portfolio or holds in trust for investors more than one out of every five mortgages originating in the United States.

Fannie Mae purchases mortgage loans from approved seller/services. Service of the loan is provided in accordance with standards promulgated in Fannie Mae's selling and servicing guides. These guides detail Fannie Mae's requirements for determining the flood-zone status of a property at origination, obtaining and maintaining an acceptable flood insurance policy, and monitoring the status of the property to ensure that flood risk is properly identified throughout the life of the mortgage. Fannie Mae also has statutory obligations with respect to requiring flood insurance; therefore, its standards are shaped in part by its obligations as defined in flood-related legislation.

Fannie Mae has partnered with the FEMA to rollout a unique pilot for Florida Homeowners. As part of FEMA's disaster preparedness "Project Impact" initiative, this pilot will help participants secure the necessary financing at competitive interest rates to complete hurricane disaster upgrades in their homes. Upgrades available include strapping down the foundation, reinforcing the roof and chimney, and installing special hurricane shutters. A network of certified contractors will make all improvements. The loans will be originated by a Fannie Mae-approved specialty third-party originator and serviced by a Fannie Mae-approved loan servicer. Our initial Project Impact loan pilot was announced by Vice President Al Gore in Deerfield Beach, Florida on August 7, 1998. In 1999, FEMA continued to work with Fannie Mae to rollout related Project Impact initiatives in other areas of the country vulnerable to natural disasters, such as massive flooding, tornadoes, and earthquakes.

Mapping Concerns. As an investor in home mortgages, Fannie Mae is concerned about the quality of the mortgages. This concern includes ensuring that mortgage assets are properly protected against hazards, including flooding. It is concerned, therefore, that flood maps provide an accurate means for easily ascertaining the flood insurance risk of a designated property. Further, the mortgage loan process is becoming increasingly automated. The time required to apply for, underwrite, and close a mortgage loan has shrunk in some cases from weeks to days.

The mortgage industry must be able to rely on flood maps that are consistent with the faster, more streamlined mortgage process.

In summary, Fannie Mae believes the flood mapping process should result in FIRMs that are easily accessible to the lending industry, very accurate with respect to determining and depicting the flood-hazard area (flood boundary), and easy to interpret.

7.2.7 Federal Emergency Management Agency

Internet: www.fema.gov

The Organization. FEMA's mission is to provide leadership and support to reduce the loss of life and property and protect the nation from all types of hazards. It is a 2,500-person agency supplemented by over 5,000 stand-by disaster reservists. FEMA provides preparedness and response and recovery support to the nation and, through its *Project Impact: Building Disaster Resistant Communities* initiative and other mitigation activities, provides leadership in preventing and reducing risk before disaster strikes. By taking action before disaster strikes, FEMA hopes to reduce the amount of federal money spent on picking up the pieces after a disaster and hopes to reduce the risks for property loss and loss of life that every state faces.

Mitigation is defined as "sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects." It describes the ongoing efforts at the federal, state, local, and individual levels to lessen the impact of disasters upon our families, homes, communities and economy. Mitigation is the cornerstone of emergency management. FEMA's Mitigation Directorate is dedicated to increasing the public's awareness of their risks, providing guidance to build safer, and outreaching to others to spread the word about mitigation successes. Mitigation involves keeping homes away from floodplains, engineering bridges to withstand earthquakes, creating and enforcing effective building codes to protect property from hurricanes—and much more.

Through the application of mitigation technologies and practices, our society can ensure that fewer Americans and their communities become victims of natural disasters. For example, mitigation measures can be applied to strengthen homes, so that families and personal belongings are better protected from floods, earthquakes, hurricanes, and other natural hazards. They can be utilized to help business and industry avoid damages to their facilities and remain operational in the face of catastrophe. Mitigation technologies can be used to strengthen hospitals, fire stations, and other critical service facilities so that they can remain operational or reopen more quickly after an event. In addition, mitigation measures can help reduce disaster losses and suffering so that there is less demand for money and resources in the aftermath.

Mapping Concerns. FEMA administers the NFIP, a federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding. This protection is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods. Participation in the NFIP is based on an agreement between local communities and the federal government that states if a community will adopt and enforce a floodplain management ordinance

to reduce future flood risks to new construction in Special Flood Hazard Areas, the federal government will make flood insurance available within the community as a financial protection against flood losses.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, seawalls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses, nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked. In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U. S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

Since the 1970s, FEMA's Technical Services Division, within the Mitigation Directorate has been responsible for creating, updating, maintaining, and storing flood-hazard maps for the NFIP communities across the United States. Over the same time period, there has been a computer revolution—from mainframes to personal computers to local area networks to the Internet. Advancements in hardware and software have enabled a mapping revolution—from manual cartography to computer-aided design to Geographic Information Systems to real-time high-resolution digital satellite imagery.

FEMA maintains warehouses of paper maps, flood profiles, Letters of Map Change, and other hardcopy data supporting the day-to-day work of the NFIP. Through our Map Modernization Plan, we plan to take advantage of technology to automate these products where possible, especially in the development of future mapping products. As we move toward the next century, our goal is to work cooperatively with our federal, state, and local partners to bring greater flexibility, access, accuracy, and efficiency to the process of creating and disseminating flood-hazard maps.

7.2.8 Freddie Mac

Internet: www.freddiemac.com

The Organization. Freddie Mac is a stockholder-owned corporation chartered by Congress in 1970 to create a continuous flow of funds to mortgage lenders. By purchasing mortgages from primary lenders for its portfolio or to package into securities that are sold to investors, Freddie Mac sustains a stable mortgage credit system and reduces the mortgage rates paid by homebuyers. Over the years, Freddie Mac has opened doors for one in six American homebuyers and two million renters across America.

Mapping Concerns. If the insurable improvements on a property securing a mortgage originated for sale to Freddie Mac or serviced for Freddie Mac are determined to be in a Special Flood Hazard Area (SFHA), Freddie Mac requires that the borrower maintain flood insurance on such improvements. The financial institutions that originate residential mortgages for sale to Freddie

Mac or service mortgages for Freddie Mac, or the professional flood zone determination firms with which these institutions contract, must use FEMA's flood maps (Flood-Hazard Boundary Maps or Flood Insurance Rate Maps) to determine whether the improvements on a mortgaged property are in an SFHA. Thus, although Freddie Mac does not use FEMA's flood maps, its interests would be affected if the assessment of its collateral's exposure to flood risks were based on maps the integrity of which is subject to challenge. Freddie Mac's participation in the Council is mandated by the NFIRA.

7.2.9 National Flood Determination Association

The Organization. The organization is comprised of flood determination firms that have strong technical expertise and extensive experience with mapping products and FEMA processes. It is committed to developing a code of ethics and a set of standards for the industry as a whole, and to the application of computer technology in producing and distributing accurate and timely map products. National Flood Determination Association (NFDA) membership includes land surveyors, engineers, geographers, other technically oriented professionals, and businesspersons whose primary livelihood depends on the success of the NFIP. Their representation on the Council offers policymakers the viewpoints of FEMA map customers who have a major stake in supporting the Council in accomplishing its mission.

The flood determination industry came into being because lenders and others were finding it difficult to interpret the NFIP regulations, to obtain and read the FIRMs, and to obtain accurate community status information. For a modest fee, association members relieve their clients of this burden and provide determinations for properties to be mortgaged. Members also operate a monitoring service, known as “life-of-loan tracking,” to supply updated information to lenders. The service notifies its users of changes in flood insurance requirements for the loans in their portfolios.

Mapping concerns. NFDA members read maps and give out information daily. Because of their intensive usage of the maps, they probably are more aware than many other users of inaccuracies, particularly in older maps, that leave properties at risk outside of flood zones or show well-elevated properties within them. Since the organization’s beginning, it has provided information to FEMA on the inaccuracies that become apparent. Members also have noted mistakes, such as streets improperly named or areas left out of the mapping process. NFDA also finds that the Community Status list is often in error—an understandable situation considering the mammoth undertaking of mapping the entire United States and its territories.

NFDA members also are acutely conscious of the need for timely distribution of maps, LOMAs and LOMRs, and other mapping products.

The advent of newer technology, including more powerful computer systems and sophisticated software, offers an opportunity for flood-zone vendors to develop databases and interactive processes to provide information for their clients. The research effort that many NFDA members have expended in developing these systems gives them an unique understanding of the challenges that FEMA faces in producing new products and in updating old and inaccurate information.

7.2.10 National Geodetic Survey

Internet: www.ngs.noaa.gov

The Organization: The National Geodetic Survey (NGS) is an office within the National Ocean Service, which is a subset of the National Oceanic and Atmospheric Administration (NOAA), a bureau within the United States Department of Commerce.

The NGS Mission: To deliver and evolve the Nation's foundation of reference for latitude, longitude, height, velocity, shoreline, and gravity throughout the United States with consistency, accuracy, timeliness, currency, and easy access to support public safety, coastal stewardship, economic prosperity, and environmental well being. In order the meet the Nation's navigation and other positioning needs, the existing coordinate reference system is being renovated to provide the higher accuracy and greater accessibility needed for use with the GPS. The digital revolution in mapping, charting, navigation, and surveying requires a National Spatial Reference System (NSRS) consisting of the following components:

- a network of monumented points having four-dimensional positions;
- a set of GPS Continuously Operating Reference Stations (CORS);
- high accuracy orbits of the GPS satellites;
- a highly accurate geoid model (a representation of the earth's gravity field); and
- a consistent, accurate, and up-to-date National Shoreline.

Activities and potential benefits: NGS is integrating these components into this evolving unified national positioning system, joined and maintained by GPS, and setting the stage for many advances. Some of the potential benefits this innovative NSRS can provide are:

- improved marine navigation aids, such as docking charts, accurate under-keel clearance information, and real-time current, tide, water level, and sea-state data in the shipping channel;
- improved aeronautical navigation aids and safer aircraft approach and landing procedures;
- advanced surface transportation control and monitoring;.
- increased efficiency in measuring crop yields, irrigation, and applications of fertilizers and pesticides mitigating non-point water pollution;
- improved crustal motion monitoring, disaster preparedness, and response;
- increases in efficiency and accuracy of three-dimensional positioning for surveying, mapping, and navigation;
- an accurate, consistent, and up-to-date National Shoreline providing a smooth transition between the ocean and land interface for more accurate modeling of flooding, storm surges, and pollution trajectories; and

- increased accuracy and reliability of data layers in GIS for better informed decision making that helps resource management and mitigation natural disasters such as flooding.

Mapping Concerns. The Federal Emergency Management Agency (FEMA) estimates that the federally backed flood insurance it provides to residents in more than 18,000 communities saves more than one-half billion dollars a year. The savings are due to the requirement that communities eligible for the insurance agree to restrict building in areas prone to flooding damage. With such a large financial stake involved, NGS standards for positioning, data submission, and archiving should be made mandatory for all flood-rate mapping. In the future, FIRMs produced by FEMA should be based exclusively on NGS-certified elevation control. The payoff can be significant, as demonstrated by homeowners along the Mississippi River near New Orleans in Jefferson Parish, where flood insurance rates were reduced by ten percent as a result of the parish's use of a GIS based on consistent coordinates established by NGS.

7.2.11 U.S. Geological Survey

Internet: www.usgs.gov

The Organization. The mission of the U.S. Geological Survey (USGS) is to provide to the nation reliable, impartial information to describe and understand the Earth. This information is used to minimize loss of life and property from natural disasters. Toward this end, the USGS has worked cooperatively with FEMA on several aspects of the National Flood Insurance Program. The USGS Water Resources Division (WRD) provides flood frequency statistics and other water data to FEMA NFIP study contractors. Some WRD district offices have also served as NFIP study contractors. The USGS National Mapping Division provides the base map for many FEMA flood-mapping products, and assisted FEMA in developing digital flood-mapping products, which are distributed in the USGS Digital Line Graph format. Recently, FEMA has participated in National Digital Orthophoto Program Steering Committee meetings. This committee guides the program resulting in the production and dissemination of USGS Digital Orthophoto Quarter Quadrangles (DOQs). In addition, the USGS is spearheading the formation of a similar consortium of federal agencies to assess the technical and budgetary requirements and specifications for nationwide, high-resolution, digital elevation data.

Mapping Concerns. The U.S. Geological Survey representative on the Council (Kari Craun) is a technical expert in the field of cartography and provides a programmatic link between the National Mapping Program and the NFIP. The mission of the National Mapping Program is "To meet the Nation's need for basic geospatial data, ensuring access to and advancing the application of these data and other related earth science information for users worldwide." The interests of the USGS on the Council are to promote the goals of the National Mapping Program as they relate to the geospatial data produced through the National Flood Insurance Program. The USGS representative also provides a link to the FGDC Subcommittee on Base Cartographic Data, chaired by the USGS. The FGDC is charged with coordinating the federal government's implementation of Executive Order 12096, "Coordinating Geographic Data Acquisition and Access; The National Spatial Data Infrastructure" (published in the April 13, 1994 edition of the Federal Register, Volume 59, Number 71, pp. 17671-17674). This Executive Order calls for the

establishment of the National Spatial Data Infrastructure, defined as the technologies, policies, and people necessary to promote sharing of geospatial data throughout all levels of government, the private and non-profit sectors, and the academic community.

7.3 Acronyms

AASG	Association of American State Geologists
ACSM	American Congress on Surveying and Mapping
ASCE	American Society of Civil Engineers
ASFPM	Association of State Floodplain Managers
BFE	Base Flood Elevation
CBRS	Coastal Barrier Resource System
CLOMR	Conditional Letter of Map Revision
CRS	Community Rating System
CTC	Cooperating Technical Community
DOQ	Digital Orthophoto Quadrangle
DEM	Digital Elevation Model
DFIRM	Digital Flood Insurance Rate Map
DTM	Digital Terrain Model
ERM	Elevation Reference Mark
F&WS	Fish and Wildlife Service
Fannie Mae	formerly, Federal National Mortgage Association
FEMA	Federal Emergency Management Agency
FGDC	Federal Geographic Data Committee
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FISCAA	Flood Insurance Servicing Companies Association of America
Freddie Mac	formerly, Federal Home Loan Mortgage Corporation
GIS	Geographic Information System
GPS	Global Positioning System
IFSAR	Interferometric Synthetic Aperture Radar
LIDAR	Light Detection and Ranging
LODR	Letter of Determination Review
LOMA	Letter of Map Amendment
LOMC	Letter of Map Change
LOMR	Letter of Map Revision

LOMR-F	Letter of Map Revision, Based on Fill
MCC	Map Coordination Contractor
MICS	Monitoring Information on Contracted Studies
MMP	Map Modernization Plan*;* published as: *Modernizing FEMA's Flood Hazard Mapping*, November 1997,
MNUSS	Mapping Needs Update Support System
MSC	Map Service Center
NAFSMA	National Association of Flood and Stormwater Management Agencies
NEMA	National Emergency Management Association
NFDA	National Flood Determination Association
NFIP	National Flood Insurance Program
NFIRA	National Flood Insurance Reform Act of 1994
NGDC	National Geographic Data Committee
NGS	National Geodetic Survey
NDOP	National Digital Orthophoto Partnership
NOAA	National Oceanic and Atmospheric Administration
NSDI	National Spatial Data Infrastructure
NSRS	National Spatial Reference System
PPS	Precise Positioning Service
SC	Study Contractor
SFHA	Special Flood Hazard Area
USACE	U.S. Army Corps of Engineers
USGS	United States Geological Survey
WRD	Water Resources Division

7.4 Flood Zone Descriptions

Zone	Description	Flood Insurance Required
A	Areas subject to inundation by a 100-year (1%-annual-chance) flood. Because detailed hydraulic analyses have not been performed, no base flood elevation or depths are shown.	**X**

AE	Areas subject to inundation by a 100-year flood as determined by detailed methods. Base flood elevations are shown within these zones (zone AE is used on new and revised maps in lieu of zones A1-A30).	**X**
AH	Areas subject to inundation by 100-year shallow flooding (usually areas of ponding) where average depths are between one and three feet. Base flood elevations derived from detailed hydraulic analyses are shown in this zone.	**X**
AO	Areas subject to inundation by 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown within this zone.	**X**
AR	Area of special flood hazard that resulted from the decertification of a flood-protection system that is in the process of being restored.	
A1-A30	Areas subject to inundation by a 100-year flood as determined by detailed methods. Base flood elevations are shown within these zones (zone AE is used on new and revised maps in place of zones A1-A30).	**X**
A99	Special flood-hazard areas subject to inundation by a 100-year flood but that ultimately will be protected by a federal flood-protection system that is being constructed. Flood-protection systems in this zone include dikes, dams, and levees on which construction progress meets statutory provisions for considering the system complete for insurance rating purposes. No base flood elevations or depths are shown.	**X**
B	Areas of moderate or minimal hazard from the principal source of flooding in the area, as identified in the community flood insurance study (FIS). Buildings in these zones, however, could be flooded by severe, concentrated rainfall where local drainage systems were inadequate. Local stormwater drainage systems are not normally considered in the community's FIS. The failure of a local drainage system creates areas of high flood risk within zone B. Flood insurance is available in participating communities but is not required by regulation (zone X is used on new and revised maps in place of zones B and C).	
C	Areas of moderate or minimal hazard from the principal source of flooding in the area, as identified in the community FIS. Buildings in zone C, however, could be flooded by severe, concentrated rainfall where local drainage systems were inadequate. Local stormwater drainage systems are not normally considered in the community's FIS. The failure of a local drainage system creates areas of high flood risk within zone C. Flood insurance is available in participating communities but is not required by regulation (zone X is used on new and revised maps in place of zones B and C).	

D	Unstudied areas in which flood hazards are undetermined but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.	
V	Coastal areas subject to inundation by a 100-year flood having additional hazards associated with storm-induced waves. Because detailed hydraulic analyses have not been performed, no base flood elevations or depths are shown.	**X**
VE	Coastal areas subject to inundation by a 100-year flood having additional hazards due to storm-induced velocity wave action. Base flood elevations derived from detailed hydraulic analyses are shown within these zones (zone VE is used on new and revised maps in lieu of zones V1-V30).	**X**
V1-V30	Coastal areas subject to inundation by a 100-year flood having additional hazards due to storm-induced velocity wave action. Base flood elevations derived from detailed hydraulic analyses are shown within these zones (zone VE is used on new and revised maps in lieu of zones V1-V30).	**X**
X	Areas of moderate or minimal hazard from the principal source of flooding in the area as identified in the community FIS. Buildings in these zones, however, could be flooded by severe, concentrated rainfall where local drainage systems were inadequate. Local stormwater drainage systems are not normally considered in the community's FIS. The failure of a local drainage system creates areas of high flood risk within zone X. Flood insurance is available in participating communities but is not required by regulation (zone X is used on new and revised maps in lieu of zones B and C).	
Source: FEMA, *Answers to Questions about the National Flood Insurance Program*, November 1997.		